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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/597,514

07/27/2006

Youhei Sakai

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26021 7590 07/23/2009  
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EXAMINER

MALEKZADEH, SEYED MASOUD

ART UNIT

PAPER NUMBER

1791

NOTIFICATION DATE

DELIVERY MODE

07/23/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/597,514	<b>Applicant(s)</b> SAKAI ET AL.	
	<b>Examiner</b> SEYED M. MALEKZADEH	<b>Art Unit</b> 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 18-36 is/are pending in the application.
- 4a) Of the above claim(s) 35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-34 and 36 is/are rejected.
- 7) ☒ Claim(s) 31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Claims **18- 34 and 36** are **elected**.

Claim **35** is **non-elected**.

Claims **1- 17** are **cancelled**.

Applicant's **election** of **claims 18- 34 and 36** in the reply filed on 04/13/2009 is **acknowledged**. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election **without traverse** (MPEP § 818.03(a)). **Claim 35** is **withdrawn** from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected **group II**,

### ***Claim Objections***

**Claim 31** is objected to because of the following informalities: Claim recites "thereagainst" in the third line which is objected. It is suggested the recitation be modified as "there against". Appropriate correction is required.

### ***35 USC § 112, Second Paragraph***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **18- 34 and 36** are rejected under 35 U.S.C. **112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Clarification is requested.

**Claim 18** recites the limitation "the adjacent lateral surface members" in the fourth line. There is insufficient antecedent basis for this limitation in the claim because prior to the recitation, however the claim recites "lateral surface members", the claim fails to distinctly claim that "lateral surface members" are adjacent. Clarification is requested. Clarification is requested.

**Claim 19** recite the limitation "the side of each of the lateral surface members" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim because prior to the cited limitation, the claim fails to clarify "a side of each of the lateral surface members." Clarification is requested.

**Claim 22** recite the limitation "the shapes of the engaging structures" in the first line of the claims. There is insufficient antecedent basis for this limitation in the claim because prior to the cited limitation, the claim fails to distinctly claim "a plurality of shapes of the engaging structures." Clarification is requested.

**Claims 22 and 23** recite the limitation "the sides on both sides of the lateral surface" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim because prior to the cited limitation, the

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claim fails to clarify "a plurality of sides on both sides of the lateral surface."

Clarification is requested.

**Claim 24** recite the limitation "its upper surface" in the third line. There is insufficient antecedent basis for this limitation in the claim because it is not defined that the recitation of "its" is referring to which member of the apparatus. Clarification is requested.

**Claim 32** recite the limitation "its inner periphery" in the third line. There is insufficient antecedent basis for this limitation in the claim because it is not defined that the recitation of "its" is referring to which member of the apparatus. Clarification is requested.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

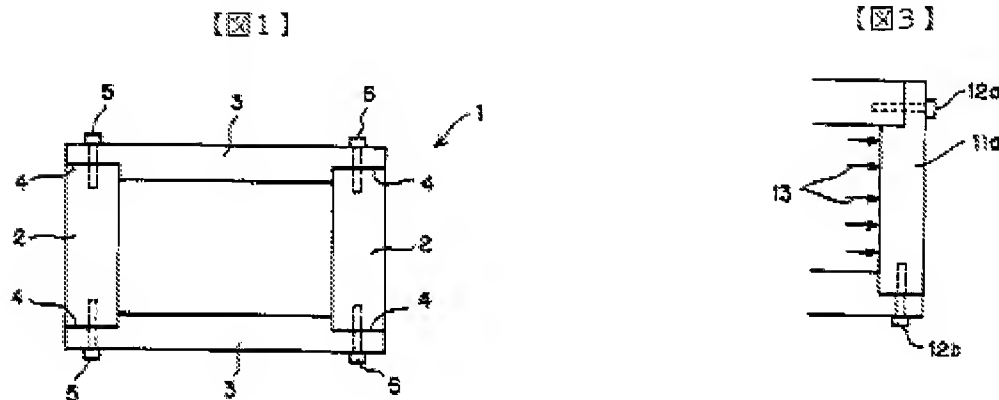
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 18- 23, 28- 34 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakaguchi et al (JP 10-182285), the prior art submitted by the applicant.**

Sakaguchi et al (JP '285) teach a casting mold apparatus for solidification of silicon in which the mold apparatus comprises a bottom

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surface member, and two first side plates (2) and two second side plates (3), together, as a plurality of lateral surface members, L-shaped notches (4) formed at the both end faces of the side plates (2), inner flanks formed at the end faces of the side plates (3), and tightening bolts (5) in which the structure members (4 and 5), together, form an engaging structure, wherein the mold consists of four sidewalls (2 and 3) and a bottom plate, and fixed to each other by tightening bolts (5). (See abstract and figure 1)



Therefore, **as to claim 18**, Sakaguchi et al (JP '285) teaches a mold formed by combining a bottom surface member and a plurality of lateral surface members (2 and 3) abutted against the bottom surface member, wherein an engaging structure (4 and 5) for fixing the adjacent lateral surface members (2 and 3) to each other which is provided on a side of each of the lateral surface members.

Furthermore, **as to claim 19**, Sakaguchi et al (JP '285) discloses the engaging structure (2, 4, and 5) comprises a projection and a recess (4) that are provided on the side of each of the lateral surface members, and **as to claim**

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**20**, the number of lateral surface members abutted against the bottom surface member is four.

Moreover, Sakaguchi et al (JP '285) teach that a width of the side plate (3) is 5 mm. (see paragraph 12); Therefore, **as to claim 21**, Sakaguchi et al (JP '285) teaches the engaging structure (4 and 5) comprises one or more engaging surfaces that are level with a bottom surface of the bottom surface of the bottom surface member, and a distance between an upper side of the lateral surface member and the engaging surface adjacent thereto is 5 cm.

Sakaguchi et al (JP '285) teach the projections of the engaging structures (4 and 5), respectively, provided on the sides on both sides of the lateral surface member (2 and 3) and are in an asymmetrical relationship with a center line of the lateral surface member, as claimed in **claim 22**. Also as to **claim 23**, Sakaguchi et al (JP '285) teach the engaging structures (4 and 5) provided on both sides of the lateral surface member (2 and 3) are in a point-symmetrical relationship with a center point of the lateral surface member (2 and 3). (See figure 1)

Moreover, as to **claim 28**, Sakaguchi et al (JP '285) teach a frame shaped member arranged so as to surround an outer periphery of the lateral surface members integrated by engaging adjacent lateral surface members for constraining displacement between the lateral surface members, and as to **claim 29**, Sakaguchi et al (JP '285) teaches the frame-shaped member (4 and 5) arranged so as to surround the outer periphery of the lateral surface

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members (2 and 3) integrated by engaging adjacent lateral surface members, and further, pressing jigs are arranged in clearances between the frame-shaped member (4 and 5) and outer corners formed by adjacent lateral surface members for constraining displacement between the lateral surface members (2 and 3). (See paragraph [0010] and abstract) Also, **as to claim 30**, Sakaguchi et al (JP '285) teach the pressing jig has two jig surfaces respectively abutted against the outer peripheral surfaces of the two lateral surface members (2 and 3) forming the outer corner of the mold.

Furthermore, **as to claim 31**, Sakaguchi et al (JP '285) teach the pressing jig has a relief groove (4) provided in an area corresponding to the outer corner of the mold in such a way that the outer corner is not directly abutted there against, and **as to claim 32**, the frame-shaped member has a projection abutted against opposed lateral surface member for constraining displacement there-between provided in inner periphery. Moreover, **as to claim 33**, the engaging structure comprises engaging surfaces that are level with the bottom surface of the bottom surface member and the frame-shaped members are arranged at positions of engaging surfaces.

Moreover, Sakaguchi et al (JP '285) teach applying silicon dioxide powder as coating layer to the inner surface of the side plate of the mold. (See paragraph [0004]) Therefore, **as to claim 34**, Sakaguchi et al (JP '285) teach a mold release material is applied to a mold inner surface comprising a bottom surface member and the lateral surface member (2 and 3) and locking sections



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formed by the bottom surface member and the lateral surface members (2 and 3).

Sakaguchi et al (JP '285) also teach the mold is used for manufacturing metal silicon coagulation and refining the semiconductor silicon ingot. (See paragraphs [0001] - [0002]) Therefore, **as to claim 36**, Sakaguchi et al (JP '285) teach a step of producing a silicon ingot using the mold and obtaining a polycrystalline silicon substrate from the silicon ingot.

The prior art, thus meets all the claim limitations and therefore, Sakaguchi et al (JP '285) **anticipates** claims **18- 23, 28- 34 and 35**.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

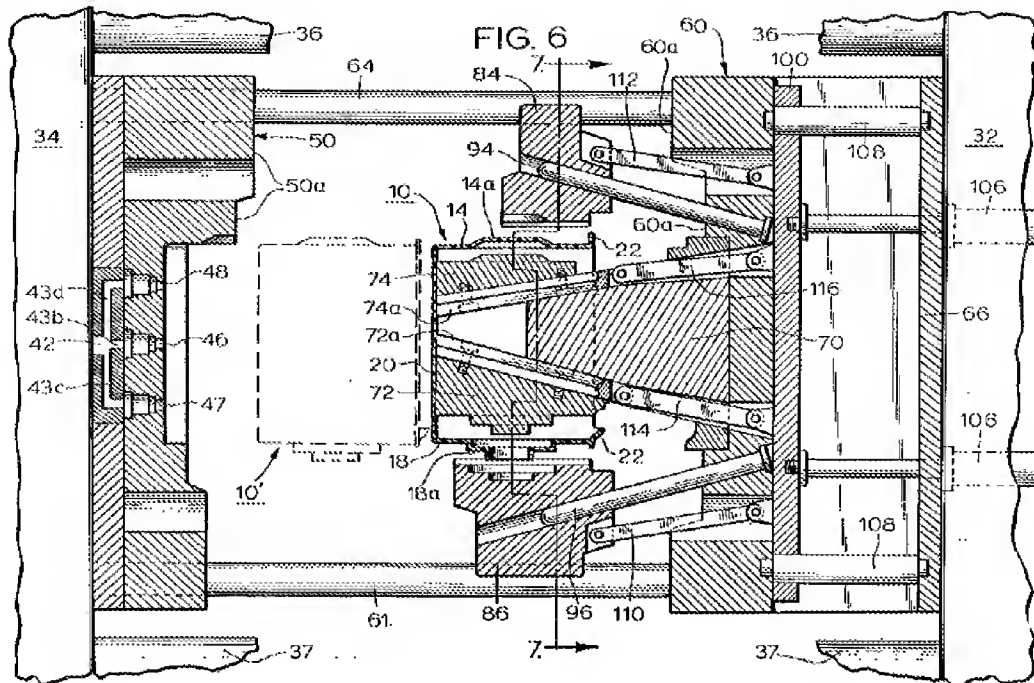
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 24- 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaguchi et al (JP '285) in view of Lovejoy et al (US 3,905,740)**

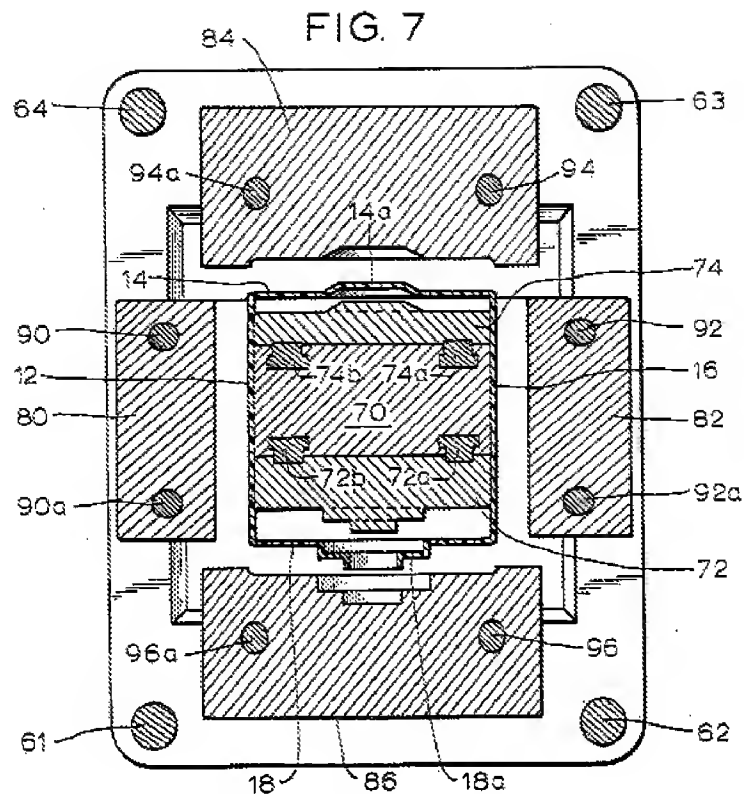
Sakaguchi et al (JP '285) teach all the structural limitations of a mold apparatus as discussed above in rejection of claims 18- 23, 28- 34 and 35.

**However**, Sakaguchi et al (JP '285) **fail** to teach the apparatus includes a closed groove in the bottom surface center in which the bottom sides of the lateral surface members are engaged with the groove of the bottom surface member and a plurality of wedge members are arranged in between the outer peripheral surfaces of the lateral surface members engaged with the groove.

**In the analogous art**, Lovejoy et al ('740) teach an injection mold for making a polygonal plastic article having a closed bottom and an open top comprising a first mold section (50) as a first mold part fixedly secured to the stationary platen (34) and having a mold defining surface corresponding to the exterior dimensions of typical molded plastic article made, and a second mold section (60) as a second mold part which is fixedly secured to the movable platen (32) and is disposed in opposed facing relation to the first mold section (50). (See lines 31-36, column 3 and lines 61-67, column 3)



Furthermore, the prior art teaches the mold (30) includes a sidewall mold means comprising four separable sidewall members (80, 82, 84, and 86). The sidewall members (80, 82, 84, and 86) are interposed between the first and second mold sections (50 and 60) and in the closed position of the mold (30) correspond with the first mold section (50) to define the exterior sidewall contour of the molded article (10). (See lines 36-51, column 4) Furthermore, the sidewall members are each supported and guided by respective pairs of guide rods (90, 92, 94, and 96) of a guide means structure in which each pair of guide rods are provided for each of the side wall members. (See lines 63-68, column 4 and lines 1-5, column 5)



Moreover, Lovejoy et al ('740) teach the four sidewall members (80, 82, 84 and 86) are each formed as rectangular blocks and inter-fit in an overlapping relation. The sidewall elements in their closed position, collectively define the exterior sidewalls in the face contour of the mold cavity. (See lines 32-39, column 6 and figure 5) Also as shown, in an open position of the apparatus, the wall parts, together, provide a space volume which is greater than the volume of the wall parts in the closed position. (See figure 6 and lines 38-45, column 7)

Thus, Lovejoy et al ('740) teach the bottom surface member include a groove (60) and the bottom sides of the lateral surface members (80, 82, 84 and 86) are engaged with the groove (60) and the groove (60) surrounds the

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bottom surface of the lateral surface members (80, 82, 84 and 86) in combination and further a plurality of wedge members (72 and 74) are arranged in between outer peripheral surfaces of the lateral surface members (80, 82, 84 and 86) engaged with the groove (60) and the bottom surface outer periphery in which the lateral surface members (80, 82, 84 and 86) are abutted against a side surface of the bottom surface member and include a mold holder for placing a bottom surface member and the lateral surface members (80, 82, 84 and 86) in combination and a wedge receiver is arranged on an upper surface of the mold holder. Therefore, **Lovejoy et al ('740) teaches** the subject mater of **claims 24- 27**.

**It would have been obvious** for one of ordinary skill in the art at the time of applicant's invention to modify the teachings of Sakaguchi et al (JP '285) through **providing** a closed groove in the bottom surface center in which the bottom sides of the lateral surface members are engaged with the groove of the bottom surface member and a plurality of wedge members which are arranged between the outer peripheral surfaces of the lateral surface members engaged with the groove **in order to** maximize the pressing between each of the lateral surface members providing a higher tightness between each of the lateral surface members, as suggested by Lovejoy et al ('740)

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Masoud Malekzadeh whose telephone number is 571-272-6215. The examiner can normally be reached on Monday – Friday at 8:30 am – 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin, can be reached on (571) 272-1189. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SEYED M. MALEKZADEH/

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Examiner, Art Unit 1791

/Steven P. Griffin/

Supervisory Patent Examiner, Art Unit 1791